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Docket No.: 1509-468



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of :
Wassim HADDAD et al. :
U.S. Patent Application No. 10/696,648 : Group Art Unit: 2663
Filed: October 30, 2003 : Examiner: Unassigned
For: WIRELESS LAN

TRANSMITTAL OF CERTIFIED PRIORITY DOCUMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

At the time the above application was filed, priority was claimed based on the following application:

British Application No. 0225311.0, filed October 30, 2002.

A copy of the priority application is enclosed.

Respectfully submitted,

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AML/gmj





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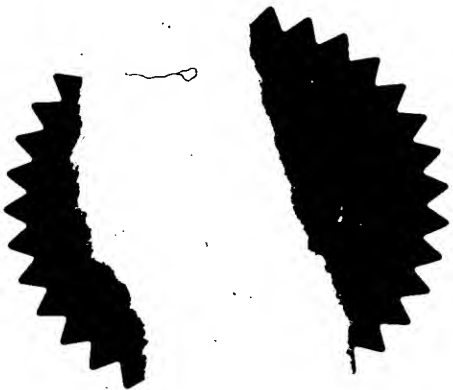
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31 OCT 02 E759868-1 D01463
P01/7700 0.00-0225311.0

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Cardiff Road
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NP10 8QQ

1. Your reference

300200013-1 GB

2. Patent application number

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0225311.0

30 OCT 2002

3. Full name, address and postcode of the or of each applicant (*underline all surnames*)

Hewlett-Packard Company
3000 Hanover Street
Palo Alto
CA 94304, USA

Patents ADP number (*if you know it*)

Delaware, USA

If the applicant is a corporate body, give the country/state of its incorporation

496588004

4. Title of the invention

Wireless LAN

5. Name of your agent (*if you have one*)

"Address for service" in the United Kingdom to which all correspondence should be sent (*including the postcode*)

Richard A. Lawrence
Hewlett-Packard Ltd, IP Section
Filton Road, Stoke Gifford
Bristol BS34 8QZ

Patents ADP number (*if you know it*)

7448038061

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Country

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Date of filing
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- a) any applicant named in part 3 is not an inventor, or
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Description

4

Claim(s)

2

Abstract

1

Drawing(s)

1 + 1

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Priority documents

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Statement of inventorship and right to grant of a patent (Patents Form 7/77)

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Request for preliminary examination and search (Patents Form 9/77)

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Fee Sheet

11.

I/We request the grant of a patent on the basis of this application.

Signature

Richard A. Lawrence

Date

30/10/02

12. Name and daytime telephone number of person to contact in the United Kingdom

Meg Joyce Tel: 0117-312-9068

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Wireless LAN

This invention relates to a wireless LAN, and in particular to a method of, and
5 apparatus for, increasing the quality of service (QoS) in a wireless LAN.

A wireless LAN can use any one of a number of known wireless technologies, such as
802.11a, 802.11b, Hiperlan/2, Bluetooth or Home RF. The choice of technology used
depends on a number of parameters. Where, however, QoS is an important factor, it is
10 usual to use 802.11a. Hiperlan/2 would be the preferred choice of wireless technology,
but this technology is currently unavailable. Some of these different technologies
operate at 5GHz (e.g 802.11a) and some operate at 2.4GHz (e.g 802.11b), and each
operates at a different data rate.

15 An aim of the invention is to increase the QoS of a wireless LAN.

The present invention provides a wireless LAN comprising an access point provided
with means for data communication over different channels each of which uses a
respective wireless technology, and at least one mobile communications device
20 provided with means for data communication over said channels and using said
wireless technologies.

Preferably, a first of the channels uses a wireless technology operating at a first
frequency bandwidth, and a second of the channels uses a different wireless technology
25 operating at a second frequency bandwidth. Each of the wireless technologies may be
one of 802.11a, 802.11b, Hiperlan/2, Bluetooth or Home RF.

In a preferred embodiment, the wireless technology used for data communications from
the access point to the or each mobile communications device operates at a higher data
30 rate than the wireless technology used for data communications from the or each mobile
communications device to the access point.

Preferably, the wireless LAN further comprises control means for controlling the wireless technologies used for data communications from the access point to said at least one mobile communications device, and for controlling the data communications from said at least one mobile communications device to the access point.

5

The invention also provides a method of controlling data communications in a wireless LAN constituted by an access point and at least one mobile communications device, the method comprising steps of:-

- 10 a) communicating data from the access point to a given mobile communications device using a first wireless technology; and
- b) communicating data from the given mobile communications device to the access point using a second wireless technology.

15 Preferably, the first and second wireless technologies are different wireless technologies, and the first wireless technology operates at a faster data rate than the second wireless technology.

20 In a preferred embodiment, the method further comprises controlling data communications so that data is downloaded from the access point to the given mobile communications device using the first wireless technology, and so that data is communicated from the given mobile communications device to the access point using the second wireless technology.

25 Advantageously, the data communicated from the given mobile communications device to the access point is uplink control signals. Alternatively, the data communicated from the given mobile communications device to the access point is uplink control signal and a data for uploading to the access point.

30 Preferably, the method further comprises controlling data communications so that any spare capacity on the second wireless technology channel is used for downloading data from the access point to the given mobile communications device.

Alternatively, the method further comprises controlling data communications so that each of the wireless technologies is used for both uploading and downloading data to and from the access point.

- 5 The invention will now be described in greater detail, by way of example, with reference to the drawing the single figure of which is a schematic representation of a first form of wireless LAN constructed in accordance with the invention.

The drawing shows an access point 1 of a wireless LAN and a mobile communications
10 device 2. The access point 1 is connected to the Internet 3 by any suitable interface. The access point 1 is provided with an antenna 4 for communication with mobile communications devices such as the mobile communications device 2. The access point 1 includes a transceiver section 1a and a control section 1b. The transceiver
15 section 1a contains hardware suitable for data communications with mobile communications devices using the wireless technology 802.11a and the wireless technology 802.11b. Similarly, the control section 1b contains software for controlling transmission and reception of data signals using both of these wireless technologies.

The mobile communications device 2 includes a transceiver section 2a for data
20 communications using the wireless technology 802.11a, a transceiver section 2b for data communications using the wireless technology 802.11b, and a control section 2c. Respective antennas 5a and 5b are associated with the transceiver sections 2a and 2b.

In use, the LAN is set up so that the access point 1 uses the wireless technology 802.11a
25 as a downlink channel for downloading data to mobile communications devices such as the mobile communications device 2, and uses the wireless technology 802.11b as an uplink channel for receiving control signals and data uploaded from the mobile communications devices. In this way, more downlink traffic can be allocated, so that an improved QoS results. Where the uplink channel using 802.11b is not fully utilised,
30 the control section 1b of the access point 1 could be arranged to use the unallocated bandwidth on the 802.11b channel for additional downlink traffic. This would, of

course, lead to a further increase in downlink traffic, and hence a further increase in QoS.

5 It will be apparent that the LAN described above could be modified in a number of ways. For example, both the uplink and downlink channels could be arranged to share both uplink and downlink traffic, the uplink channel could be used solely for control signals; or the uplink channel could be used solely for control and uplink data signals and the downlink channel solely for downloading data traffic. It would also be possible to use both channels for downlink traffic so as to provide path diversity (multi-homing).
10 For example, if the downlink channel uses Hiperlan/2 and the uplink channel uses 802.11b, spare capacity on the uplink channel could be used for downlink traffic when the capacity of the downlink channel is reached. Of course, the QoS of the additional traffic carried by the 802.11b channel would not be as good as for traffic carried by the Hiperlan/2 channel, so the control section 1b of the access point 1 would need software
15 adapted to use the 802.11b channel for downlink traffic only when the QoS required by a given mobile communications device is not a critical factor that can only be met by using Hiperlan/2.

20 It is also possible that different wireless technologies could be used for the uplink and downlink channels. In particular, where QoS is of importance, the downlink channel could use Hiperlan/2 instead of 802.11a. In practice, the access point 1 would be provided with hardware and software for data communication on all commonly-used wireless technologies, so that the access point could communicate reliably with all mobile communications devices within range. In this connection, it will be appreciated
25 that different mobile communications devices may well have different combinations of two different wireless technologies installed. Generally speaking, however, the downlink channel should use a wireless technology having a higher data rate than the uplink channel, as it is normal for users to require much more data to be downloaded than to be uploaded.

Claims

1. A wireless LAN comprising an access point provided with means for data communication over different channels each of which uses a respective wireless technology, and at least one mobile communications device provided with means for data communication over said channels and using said wireless technologies.

2. A wireless LAN as claimed in claim 1, wherein a first of the channels uses a wireless technology operating at a first frequency bandwidth, and a second of the channels uses a different wireless technology operating at a second frequency bandwidth.

3. A wireless LAN as claimed in claim 1 or claim 2, wherein each of the wireless technologies is one of 802.11a, 802.11b, Hiperlan/2, Bluetooth or Home RF.

4. A wireless LAN as claimed in claim 3, wherein the wireless technology used for data communications from the access point to the or each mobile communications device operates at a higher data rate than the wireless technology used for data communications from the or each mobile communications device to the access point.

5. A wireless LAN as claimed in any one of claims 1 to 4, further comprising control means for controlling the wireless technologies used for data communications from the access point to said at least one mobile communications device, and for controlling the data communications from said at least one mobile communications device to the access point.

6. A method of controlling data communications in a wireless LAN constituted by an access point and at least one mobile communications device, the method comprising steps of:-

a) communicating data from the access point to a given mobile communications device using a first wireless technology; and

b) communicating data from the given mobile communications device to the access point using a second wireless technology.

7. A method as claimed in claim 6, wherein the first and second wireless technologies are different wireless technologies.

8. A method as claimed in claim 6 or claim 7, wherein the first wireless technology operates at a faster data rate than the second wireless technology.

9. A method as claimed in any one of claims 6 to 8, further comprising controlling data communications so that data is downloaded from the access point to the given mobile communications device using the first wireless technology, and so that data is communicated from the given mobile communications device to the access point using the second wireless technology.

10. A method as claimed in claim 9, wherein the data communicated from the given mobile communications device to the access point is uplink control signals.

11. A method as claimed in claim 9, wherein the data communicated from the given mobile communications device to the access point is uplink control signal and a data for uploading to the access point.

12. A method as claimed in any one of claims 9 to 11, further comprising controlling data communications so that any spare capacity on the second wireless technology channel is used for downloading data from the access point to the given mobile communications device.

13. A method as claimed in any one of claims 9 to 11, further comprising controlling data communications so that each of the wireless technologies is used for both uploading and downloading data to and from the access point.

Wireless LAN**Abstract**

A wireless LAN comprises an access point (1) provided with means for data
5 communication over different channels each of which uses a respective wireless
technology, and at least one mobile communications device (2) provided with means
for data communication over said channels and using said wireless technologies.

